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Operational Diversification and Financial Performance of Sub-Saharan Africa Commercial Banks: Static and Dynamic Approach

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Abstract: Diversification is a key area in financial institution since their activities have gone beyond the traditional intermediary role. It is in this view that the study examines the effect of operational diversification on bank performance using the pooled, fixed, random and System GMM for the period 2006 to 2015 across 250 commercial banks from 30 countries in the region. Due to the robustness of SYS-GMM, the findings of this study reveal that using Herfindahl Hirschman index, all the dimensions of operational diversification; asset, liability, deposit and income including control variables such as bank size, liquidity, loan loss ratio, cost to income ratio and the lagged return on average asset (ROAA (L1)) are significant at 1% level with only deposit diversification (HHIde), liquidity (LOD) and cost to income ratio (CIR) which is a measure of banks' efficiency having negative relationship with ROAA. Therefore, this study concludes that diversification of operational activities in SSA commercial banks have direct and significant effect on their financial performances. But, greater attention should be taken to monitor the diversification strategy so as to ensure that no dimension of banks' activities is neglected.

Keywords: Herfindahl Hirschman Index; Structure Conduct Performance; operational diversification; System-GMM; Sub-Saharan Africa.

JEL Codes: G21; F39

1. Introduction

It has long been posited under the capital market theory that there is a trade off relationship between returns and risks in an entity and banking sector is not left out. The more an entity is willing to take up risk in its operations, the more returns are embedded there in. However, these risks are the market risk and the systematic risk that can't be easily diversified. Hence, following this trade off

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relationship, a well diversified bank is expected to yield higher financial returns on its fleets of investment than banks with little or no diversification.

Diversification has been a major research area for financial intermediaries in both developing and developed countries because banks' activities have gone beyond their traditional intermediary role they perform between the surplus and deficit unit of the economy but into different kinds of activities in the financial market and rendering other financial services. Following the postulations of the traditional theory of portfolio, diversification is a means of reducing risk of investment portfolio by reducing the level of risk exposure via increase in their risk appetite. Research on diversification in banking sector is required because of the conflicting predictions given by theoretical and empirical papers on the impact of greater banking activities diversity on their financial performance. Despite the fact that banks benefit from diversification in terms of economies of scale, it is a process that can also intensify agency problems (costs) due to the fact that managers (insiders) may expand the financial activities in the bank in as much the diversification process accords them private benefits from the institution. Even though operational diversification may ease information asymmetries and enhance the efficient allocation of resources via internal capital markets, banks may still be inefficient in the design of managerial incentive contracts by witnessing controversies in aligning process of outsiders and insiders (Rotemberg & Saloner, 1994). It is possible for managers to continue diversifying activities and hinder financial performance of the bank in as much their extra personal gains exceed the loss incurred or reduced performance.

However, for diversification to actually fulfill its expectations there must be adequate monitoring of all the activities diversified into. For banks to actually attain the ultimate goals of diversification in all dimensions, proper monitoring of the activities involved must be put in place. Reverse is the case of commercial banks in most of the SSA countries, instead of diversification to spur the performance of banks, it always results into crisis and they continue to struggle for solvency and survival despite the fact that they render more services than their traditional roles. Instead of diversification to minimize agency problem, the problem keeps compounding that most of the banks continue to merge and remerge. Could it be that the activities diversified into are not well managed or diversification has no significant effect on SSA banks' financial performance? It is impossible for commercial banks to beat down agency costs and maximize shareholders' wealth without spreading their tentacles through diversification means so as to enjoy economies of scale. Surprisingly, commercial banks still struggle for survival despite the level of their diversification of loans, deposits, assets and liabilities. It is certain that diversification of banking operations exposes the banks to diverse kinds of new risks and management team lacks the required expertise to control these risks effectively and efficiently. Also,

diversification may lead to conflict of interest between investors and the banks itself which thereafter post a negative effect on their financial performance (Berger & Ofek, 1996; Demsetz & Strahan, 1997). Conversely, despite all the demerits of diversification, findings of Landi and Venturelli (2001); Berger et al. (2010) to mention a few found out that banking sector tends to benefit more diversification in terms of stable and higher returns from assets; escape from unsystematic risk and enhancement of more efficiency in the bank.

Obviously, all these benefits have not manifested in SSA commercial banks as the key role of economies of scale in minimizing agency problems has not been evident in commercial banks globally (Goetz et al., 2013). Since the global financial crisis of 2009, the commercial banking system of most economies in the region have been transformed either by merger and absorption, this has led to the increase in size and only South African economy in the region, has developed banking institution while others still remain impoverished and underdeveloped (Mlachila et al., 2013).

The global financial crisis of 2007 to 2009 spelt out the need for banks to be more liquid, less levered, more transparent to shareholders in terms of dividend and less prone to excessive risk (Cohen, 2013). The above makes the banks' ability to widen their scope very important in order to be able to increase risk appetite and absorb the market risk incidence faced as a result of their activities. Viewing diversification from performance dimension, managers diversify in an attempt to improve performance or make excess profit that can be distributed to the dividend income-oriented shareholders in order to satisfy their urge for dividend. Jensen and Meckling (1976), however, noted that managers can because of their private benefits pursue diversification of firms' activities, hence agency (problem) cost. From the review of literature, there are studies on the impact of diversification on financial performance in developed economies but not many of them have been conducted in SSA. Efforts in this direction in SSA countries include Teimet et al. (2011); Amediku (2012); Senyo et al. (2015) to mention but a few, all investigating income diversification in relation to performance. Those studies, however, are noted to have certain shortcomings, namely the omission of some variables or important measures and dimensions of diversification in banks such as deposit, asset, loan and operational diversifications as a whole. Therefore, this study of operational diversification and financial performance of banks in Sub-Saharan Africa intends to narrow down the gap in the literature by vividly assessing assets, loans, deposits and liabilities diversification in banks which were seen by Mulwa et al. (2015) as the core dimensions of banks' operational diversification. This study is necessary to confirm if banks need to diversify across various activities or they should focus and specialize on their main role of rendering intermediary services. The effect of diversification in minimizing risk and maximizing returns in banking sector has been scanty in banking literature

focusing the countries in SSA but, this study is unique by considering a wider geographical scope (SSA region) and to the best of the researcher's knowledge; it is the first of its kind in SSA region because this lacuna necessitates further study on the subject matter, hence the current study.

Given the above introduction, the rest of this paper is structured as follows for logical presentation. The next section focuses on literature review, followed by the research design, methodology and model specification, followed by analysis of data, interpretation, discussion of analysis and implication of the findings. The next section concludes the paper and makes relevant recommendations while the last section suggests for further study on dividend policy to address the limitations of this present study.

2. Literature Review

2.1. Conceptual Review

2.1.1. Managerial Entrenchment and Diversification Strategies

Managerial entrenchment concept was developed by Shleifer and Vishny (1989). This concept describes the attitude of managers building up empire and making them irreplaceable or costly to replace for the shareholders. This entrenchment trait can only be detected by their choices of investment, contracts and the motive behind diversification initiated by them. Excessive growth in firms signals managerial entrenchment because managers have higher incentive to invest more such as higher wealth, fame or consumption of perquisites attributable to them from increased investment. This concept needs to be monitored because it creates costs to shareholders in terms of social inefficiency and expropriation of wealth from shareholders to managers via rent seeking.

Managers' motive behind diversification at times leads to poor financial performance even though other underlying industry conditions that render managers' effort useless might be the cause. It is pertinent to know that managerial entrenchment is a costly burden shareholders have to bear; hence diversification strategy might fail to create value to firms if not monitored. Simmilarly, the following mechanisms were suggested to solve the problem of managerial entrenchment in firms' diversification strategies; first, there must a knowledgeable board of director who can properly evaluate the new investment ideas or projects proposed by the managers so as to know if they are viable or otherwise. Secondly, right managers must be selected by the nominating committees of the board of directors and lastly, board of directors must choose to make managers' pay lucrative and also grant them voting control of the firm. By the effect of those three corporate governance strategies, the managers possess ownership stake in the firm which will overcome the pursuit of selfish interest by

the managers and eradicate the invaluable diversification strategies perpetrated by managerial entrenchment problems in the firm.

2.1.2. Managerial Hubris and Diversification Strategies

This concept was developed in the seminar paper of Roll (1986). This postulation of this concept is that managers diversify into so many activities with the intention to take over the firm. They achieve this selfish aim by over valuation of the firm so as to meet up with their own target valuation. According to Gaughan (2005), managers believe that their valuation is superior to the market's valuation because of pride. Generally, there are indicators of managerial hubris; viz, praise of the management team; excellent organisations success, managers' self-importance or overconfidence in the firm. All these indicators must be considered before institutionalising diversification strategies in the firm because mangers' rise in power and prestige will not aid value creation which is the ultimate goal of diversification. Thus, proper corporate governance must be put in place to ensure that the Chief Executive Officer (CEO) is not the chairman of the board of directors.

2.1.3. Operational Diversification Strategy

There are different administrative linkage mechanisms to respond to organisational changes at the entrance into new diversified activities. Generally, firms pursue diversification so as to explore the available investment opportunities by taking exploit of underutilised resources within the firm and take advantage of market imperfections so as to create new growth opportunities. Diversification strategy can be classified in terms of the degree of diversification (quantitative) and the type of diversification (qualitative). As noted by Datta et al. (1991), diversification degree refers to dispersion of firm's assets across various markets while the type of diversification simply means the active diversity across different businesses which could also mean operational diversification even though it might be related or unrelated. Commercial banking sector because of their peculiarities operates the related diversification where the activities involved offer more opportunities to share capabilities, assets and other relevant financial resources. Therefore, operational diversification in banks enhances banks to enjoy more economies of scope because the core dimensions of diversification of banking operations (asset, loan, income, deposit) are related.

The dimensions of operational diversification have empirical evidences from past research on diversification. For instance, Liang and Rhoades (1991) provide evidence that banks diversify their loan portfolios across diverse kinds of loans subsequent to their geographical diversification. Also, Saksonova and Solovjova (2011) aver that commercial banks can diversify not only their liability portfolio but also their deposits and investments. Another dimension is the asset diversification which is measured as the sum of squared of net earning assets, non

earning assets, liquid assets and fixed asset to total assets. It is the distribution of a bank's assets across the various categories of assets such as lending (liquid) assets, non-lending (fixed) assets and so on (Doumpos et al., 2013; Elsas et al., 2010).

2.2. Theoretical Review on Diversification

2.2.1. Market Power Theory

Diversification is one of the strategies to curb competition by enabling firms to increase market power because of the conglomeration of power from the diversified activities. Diversified firms build up market power to compete because of their stake in other markets in which their activities have been diversified into. The argument of market power theory originates from the study of Porter (1980) who used different strategies to distinguish a firm's position among the competitors. Market power theory posits that diversification propels higher profitability in firms because firms with market power can cross subsidize, that is; use the gain derived from one market to support marauding pricing of other markets; mutual and reciprocal buying and selling in such a way that potential competitors find it hard to enter the industry.

2.2.2. Resource Based View (RBV) Theory

This theory originates from the seminar paper of Penrose (1959) and advanced further by Rubin (1973). RBV theory is based on the assumption that firms attain sustainable competitive advantage by undertaking deliberate managerial efforts. This theory explains the resource-benefit a firm enjoys such that the firm resources can build barriers to ensure that resource holders are able to enjoy the competitive advantage in relation to other parties. The main postulation of this theory is that firms usually have productive resources that can be used to exploit productive opportunities that give room for growth. According to Contractor et al. (2003), firms derive benefits from sharing tangible resources, technology know-how, vertical integration, coordinated strategies and pooling together their negotiating power. By taking advantage of all these, the firms generate economies of scope and scale by increasing their efficiency in the continuous use of these resources. Conclusively, firms through diversification across many activities maximise the exploitation of their valuable resources and hence increase their financial performance, thus, this theory recommends diversification through resource building in entering new market which provides cost benefits to the firm.

3. Research Designs, Scope, Data Description and its Sources

This study falls under the positivism paradigm and the approach adopted is deductive. It falls under this paradigm because it is a pure quantitative study. 250 commercial banks with up-to-date data available on dividend policy in Bloomberg

and Bank Scope database are used for this study for the period covering 2006 to 2015. The 250 banks are selected using proportionate stratified simple random sampling techniques from 30 SSA countries with similar economic nature and banking characteristics.

3.1. Model Specification

Upon all the reviews of theories on diversification strategies in banks, the objective three that addresses the effect of operational diversification on banks' performance is hinged on the Resource Based View (RBV) theory. This theory is chosen because of its postulations that firms should use their available resources to enjoy competitive advantage, scale and scope efficiency from synergy. Commercial Banks are endowed with wider categories of operational resources that can be diversified, for example assets, loans, deposits (main banks' liability) and income. Thus if all these resources are efficiently utilised, there is the need to quest for its impact on their financial performance. Also, this study is based on the Manson's Structure Conduct and Performance (SCP) Paradigm following the recommendations of Mishra and Sahoo (2012) and Nabieu (2013) as the best hypothesis for testing the relationship between structure, conduct and performance of banking sector. SCP hypothesis shows the relationship that subsists among market structure, firm conduct and firm performance. The model avers that what chiefly determine a firm's profit are the barriers of entry, concentration or the diversification of their activities. In banking context, the term "structure" in the SCP framework means the concentration or diversification of activities; and the number of banks in the industry, hence, market structure of banks is affected by internal variables such as diversification, concentration, regulatory controls and other external factors such as economic conditions (Nabieu, 2013). The term "Conduct" in the framework denotes how the banks behave in the market which includes their response to occasional withdrawals, price fluctuation, marketing strategies and the innate behaviours of the banking business. Lastly, the term "Performance" refers to the quantity of returns generated from banks' products and services rendered (Nabieu, 2013). SCP hypothesis affirms that firms' market structure affects their conduct and after all affects the performance of the firm. It is of no doubt that diversification in firms affect their returns because of its possibility of minimizing risk via spread of activities (Turkmen & Yigit, 2012).

Why SCP Model?

SCP paradigm affirmed that the conduct of the firm which is invariably affected by the market structure of a firm is a core determinant of firms' performance. Due to this fact, it has been widely utilised. SCP model is suitable for banking sector and it is chosen for this study because of its advantages over other hypotheses such as:

(i) SCP clearly reveal how banks are operating; it shows and clarify the diverse forces affecting bank operations and make it clear for these banks whether to expand or place restrictions on the scope of their operations in the industry at large; (Nabieu, 2013)

(ii)SCP framework helps in interpretation of different productivity sources; (Delorme Jr et al., 2002)

(iii) SCP hypothesis gives a rational and widely accepted basis for banking behavioural analysis in the absence of any concrete theory. (Nabieu, 2013)

Following the mathematical simultaneous equation framework of SCP hypothesis as used by Delorme Jr et al. (2002); Mishra and Sahoo (2012) and Nabieu (2013), this study adopts the performance equation generated from the hypothesis;

$$S = f(C, P, W) \quad \text{.....(1)}$$

$$C = f(S, C, P) \quad \text{.....(2)}$$

$$P = f(S, C, W) \quad \text{.....(3)}$$

Equation 3 is the performance model; where, S stands for Market Structure of the bank; C stands for the conducts of the bank; P is the performance variable and W stands for the vector of control variables that can affect the dependent variable.

Therefore, explicitly writing the model in panel data econometric form;

$$P_{it} = a_0 + \sum_{i=1}^{n} S_{it} + \sum_{i=1}^{n} C_{it} + \sum_{i=1}^{n} W_{it} + \varepsilon_{it} \quad \text{.....(4)}$$

Explicitly to reflect the diversification and other selected variables,

$$ROAA_{it} = f(DIV, SIZ, LOD, LLR, CIR) \quad \text{.....(5)}$$

According to Berger et al. (2010) and Mulwa et al. (2015), banking operations could be diversified into four major dimensions; Income, loans, deposits and assets.

Hence,

$$ROAA_{it} = f(DIVas_{it}, DIVde_{it}, DIVlo_{it}, DIVin_{it}, SIZ_{it}, LOD_{it}, LLR_{it}, CIR_{it}) \quad \text{.....(6)}$$

$$ROAA_{it} = a_0 + \beta_1 DIVas_{it} + \beta_2 DIVde_{it} + \beta_3 DIVlo_{it} + \beta_4 DIVin_{it} + \beta_5 SIZ_{it} + \beta_6 LOD_{it} + \beta_7 LLR_{it} + \beta_8 CIR_{it} + \varepsilon_{it} \quad \text{.....(7)}$$

Equation (7) is the operational diversification model of commercial banks in SSA.

Based on the fact that diversification has been an interesting research area of

research, different indices have been used to measure diversification degree but with larger percentage of Herfindahl Hirschman Index (HHI). Numerous studies have used HHI across countries in SSA regions, emerging markets and other developed countries such as Ugwuanyi and Ugwu (2012) in Nigeria; Amediku (2012) in Ghana; Simpasa and Pla (2016) in Zambia; Kiweu (2014) in Kenya; Amidu and Wolfe (2013) in emerging markets; Mishra and Sahoo (2012) in India; Vieira and Girão (2016) in Brazil; Behr et al. (2007) in Germany; Kurincheedaran (2015) in Sri Lanka. All these studies conclude that HHI is a commonly accepted index to measure corporate diversification and it is the most suitable for measuring diversification in financial sector. Thus, in this study, HHI index is used to measure the degree of operational diversification.

Conclusively, the operational diversification model of SSA commercial banks is:

$$ROAA_{it} = a_0 + \beta_1 HHIas_{it} + \beta_2 HHIde_{it} + \beta_3 HHIlo_{it} + \beta_4 HHIin_{it} + \beta_5 SIZ_{it} + \beta_6 LOD_{it} + \beta_7 LLR_{it} + \beta_8 CIR_{it} + \varepsilon_{it} \quad (8)$$

In the dynamic form for the purpose of System-GMM, the operational diversification model takes the form;

$$ROAA_{it} = a_0 + \beta_1 ROAA_{i(t-1)} + \beta_2 HHIas_{it} + \beta_3 HHIde_{it} + \beta_4 HHIlo_{it} + \beta_5 HHIin_{it} + \beta_6 SIZ_{it} + \beta_7 LOD_{it} + \beta_8 LLR_{it} + \beta_9 CIR_{it} + \varepsilon_{it} \quad (9)$$

Taking clue from the above model, $ROAA_{it}$ is the financial performance measure, a_0 is the constant term, $\beta_2 - \beta_5$ is the estimated coefficient of operational diversification, $\beta_6 - \beta_7$ is the estimated coefficient of the variables that proxy banks conduct, $\beta_8 - \beta_9$ is the estimated coefficient of the control variables, ε_{it} is the stochastic error term, $HHIas_{it}$ stands for the asset diversification; $HHIde_{it}$ stands for the deposit diversification; $HHIlo_{it}$ is the loan diversification; $HHIin_{it}$ is the income diversification; SIZ_{it} is the bank size; LOD_{it} is the loan to deposit ratio which measures banks' liquidity; LLR_{it} is the loan loss ratio; CIR_{it} is the cost to income ratio; i is the cross-section (banks) and t stands for the time period.

Apriori Expectation

Following the SCP paradigm postulations, Resource Based Value (RBV) theory and the empirical findings of the aforementioned literatures $\beta_1 - \beta_8 > 0 and \beta_9 < 0$.

4. Model Estimation and Data Analysis

4.1. Descriptive Statistics of the Variables

This section shows the purview of the pooled observation of variables used in this study for the period under investigation of the operational diversification of SSA banks with reference to the mean, standard deviation, skewness, kurtosis, minimum and maximum statistics of the variables. The panel data used to capture these variables are on yearly frequency with all in ratio form except SIZ that is in natural logarithm form.

Table 1. Summary Analysis of the Series: ROAA, HHIas, HHIde, HHIlo, HHIin, SIZ, LOD, LLR, and CIR

	ROAA	HHIas	HHIde	HHIlo	HHIin	SIZ	LOD	LLR	CIR
Mean	1.8598	7892328	267600.3	0.842746	370380.1	13.19135	4.360818	5.173858	65.68095
Med	1.8550	0.08594	0.1316	0.4067	0.6043	13.14	0.636	3.013	59.21
Max	38.713	3.12E+09	9394044	611.75	8.38E+08	18.30	3960	100.0	850.0
Min	-54.733	6.38E-06	7.59E-07	0.0000	4.33E-06	3.777691	0.000	0.000	0.0000
St-D	3.3494	1.29E+08	3954318.	12.90130	1761570	1.569593	96.66950	7.178265	48.33402
Skew	-1.600	18.263	17.444	46.919	47.560	-0.864	35.48	6.125	7.285
Kurt	60.816	360.873	340.36	2221.8	2263.0	8.997	1351	65.52	89.91
Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Obs	2265	2265	2265	2265	2265	2265	2265	2265	2265

Source: Author's Computation, 2017

The table 4.1. above shows the descriptive analysis results of all the activities regarding the operational diversification and financial performance of commercial banks in SSA for the period 2006-2015. The return on average assets (ROAA) measured the performance of the banking industry while HHIas, HHIde, HHIlo, HHI in which are proxies for asset, deposit, loan and income diversification are used to measure operational diversification of banks. The average rate of ROAA is 1.859869% implies that the average performance of the SSA commercial banking industry is not low but encouraging. It is evident from the result that all the series display a higher level of consistency as their mean, median and standard deviation values consistently fall within the range of minimum and maximum values of the series. Also, the relatively low value of standard deviations for most of the series except income diversification (HHIin) indicates the small level of deviation of actual data from their mean or expected average value. From the skewness statistics, only performance measure (ROAA) and bank size (SIZ) are negatively skewed because their distribution have long tail to the left while other variables in the series are positively skewed because their distribution have a long tail to the

right. However, the kurtosis of the financial variables showed that all the variables under consideration are leptokurtic nature because the kurtosis coefficient indexes are all positive. But probability values of 0.000 for all the variables in the series shows that the model is of good fit and all the variables in the study is expected to significantly impact the financial performance of SSA banking industry. Due to availability of data, only 2265 observations are recorded for all the variables in the series instead of 2500 observations.

4.2. Correlation Analysis

In an attempt to show existence and direction of association or relationship between pairs of variables in the operational diversification model, this section presents the correlation coefficients matrix. However, correlation analysis only depicts the degree and direction of linear relationship between pairs of variables.

Table 2. Correlation Matrix of the series ROAA, HHIas, HHIde, HHIlo, HHIin, SIZ, LOD, LLR, CIR

VARI-ABLE	ROAA	HHIas	HHIde	HHIlo	HHIin	SIZ	LOD	LLR	CIR
ROAA	1								
HHIas	0.005	1							
HHIde	-0.016	0.800	1						
HHIlo	-0.000	-0.001	-0.001	1					
HHIin	0.003	0.010	0.007	0.001	1				
SIZ	0.125	-0.363	-0.392	0.020	0.035	1			
LOD	-0.343	-0.002	-0.002	-0.001	-0.001	0.095	1		
LLR	-0.145	-0.035	-0.014	-0.013	-0.011	-0.013	0.095	1	
CIR	-0.420	-0.011	0.006	-0.004	0.000	-0.218	0.009	0.042	1

Source: Author's Computation, 2017

From Table 4.2. there is a mixture of the nature of relationship among the variables. While asset diversification (HHIas), income diversification (HHIin) and bank size (SIZ) depict a positive but weak relationship with bank financial performance (ROAA), other variables such as deposit diversification, loan diversification, liquidity measure, loan loss ratio and cost income ration shows a negative relationship of -0.016; -0.000; -0.343, -0.145; -0.420 respectively even though the deposit and loan diversification correlation degree is extremely low and weak but the degree of liquidity (LOD) and Cost to income ratio (CIR) that are a bit high is still not a signal of multi-colinearity as it is not up to the 0.8 which is the rule of thumb. From the asset diversification perspective, only deposit and income diversification proxies are positively associated with asset diversification while all other variables in the series are negatively correlated with asset diversification. In the stream of deposit diversification, only income diversification and cost to income ratio is positively related while other remains negative but none is high to

depict multi-colinearity. In loan diversification stream, only income diversification and bank size posits positive correlation while others remain negative but all extremely weak. While bank size and cost to income ratio have positive but very weak correlation with income diversification, liquidity and loan loss ratio posits a negative relationship. For bank size (SIZ), liquidity (LOD) and loan loss ratio (LLR) and cost to income ratio (CIR), only CIR and LLR posit negative relationship with SIZ to the tune of -0.013 and -0.218 respectively. Conclusively, form the correlation matrix of this series, no evidence of strong relationship that can lead to the problem of multi-colinearity in our estimations but correlation matrix is limited because it cannot show reliable relationship among variables with the inclusion of other explanatory variables. The degree and direction of association between pairs of variables derived from correlation matrix does not give the result of each variable's association with all other explanatory variables in the series. This informs the reasons for this study to proceed further to multivariate regression analysis such as static-Pooled, fixed effect, random effect frameworks.

4.3. Pooled, FEM and REM Regression Estimation

Pooled estimation places restrictions on the heterogeneity/uniqueness of the cross sectional units by stacking all the observations without taking into account their cross sectional or time series features Relative to the pooled regression estimator, fixed effect estimator takes cognizance of subject and/or period heterogeneity/uniqueness that may exist in the regression model while random effect estimation assumes that the heterogeneity is random rather than fixed and that the random effect is incorporated into the error term thus forming a composite error term.

Table 3. Regression estimations of Series: HHIas, HHIde, HHIlo, HHIin, SIZ, LOD, LLR, CIR with Dependent Variable: ROAA

	POOLED		FEM		REM	
VARIABLE	COEFF	P>/t/	COEFF	P>/t/	COEFF	P>/t/
C	3.511268	0.000 ***	-0.889230	0.407	1.565398	0.043**
HHIas	6.98e-10	0.364	1.81e-10	0.895	1.07e-09	0.270
HHIde	-2.75e-08	0.309	-4.41e-09	0.880	-2.34e-08	0.365
HHIlo	-6.18e-10	0.853	-3.35e-10	0.912	-3.93e-10	0.895
HHIin	0.0001626	0.972	0.0009624	0.815	0.0007296	0.858
SIZ	0.0372227	0.379	0.3331882	0.000 ***	0.160817	0.004 ***
LOD	-0.011417	0.000 ***	-0.010833	0.000 ***	-0.011067	0.000 ***
LLR	-0.044473	0.000 ***	-0.024109	0.016 **	-0.030196	0.001 ***
CIR	-0.028335	0.000 ***	-0.022458	0.000 ***	-0.024572	0.000 ***
R-square	0.3015		Within=0.2729 Between = 0.3139 Overall = 0.2785		Within=0.2708 Between = 0.3815 Overall = 0.2971	
Adj R-Squared	0.2990					
F-stat	F(8,2256)=121.71		F(8, 2010) = 94.32			
Chi2-Stat					Wald Chi2(8)= 882.13	
Prob	Prob>F = 0.0000 ***		Prob>F = 0.0000***		Prob>Chi2 = 0.000***	

*Source: Author's Computation, 2017. Note that ***, ** denotes significance at 1% and 5% level respectively*

Table 4.3. above shows the static regression estimate of pooled, fixed and random effect model of operational diversification in SSA banks. From all the three estimates, none of the dimensions of operational diversification (that is, asset, deposit, loan and income) are statistically significant, but the direction of relationship as recorded in the coefficients is different for all the estimations. For pooled, FEM and REM, deposit (HHIde) and loan diversification (HHIlo)'s coefficients were negative which denotes that a higher deposit and loan diversification in banks leads to a lower bank financial performance even though they are too small to be significant at any level. Asset and Income diversification's coefficients for all the estimations are positive but also insignificant to explain the financial performance of banks in SSA. This depict that, for SSA banks, as income classified as interest income or fees and commissions are being used for different spread of the banking activities, it causes a decrease in the banks' financial performance. Likewise the increase in asset delegated into fixed, liquid and non earning asset to finance different activities brings down the financial performance of banks. Liquidity captured by loan to deposit ratio (LOD) and the control variables; Loan loss ratio (LLR) and cost income ratio (CIR) are statistically significant at 1% but all with negative relationship with SSA banks financial

performance measure (ROAA). While LOD and LLR oppose a priori expectation, the negative effect of CIR aligns with a priori expectation because a reduction in CIR depicts managerial efficiency which is also a signal of increased performance. This negative effect of all these ratios implies that the higher all these ratios, the lower the performance for SSA banks. But bank size posits a positive relationship with financial performance in all the estimations and significant at 1% for FEM and REM estimation, while pooled effect remains insignificant.

Conclusively, the significance of the constant term at 5% shows that the models are well fitted to explain the operational diversification of banks in SSA. The R-Square of pooled, FEM and REM are 30, 31 and 38% respectively.

4.4. Post Estimation Tests

To verify the best estimator which is relatively efficient and consistent amidst the likes of Pooled GLS regression estimator, FEM estimator and REM estimator, Restricted F-test and Hausman test are conducted.

4.4.1. Restricted F-test of Fixed Heterogeneity Effect

The summary of test statistics used to validate the presence of heterogeneity among cross-sectional units (banks) is shown in this section so as to know whether there is significant difference between the constant terms (differential intercept) across cross-sections. This is done with the aim to validate whether there is an established validation for the restriction of the pooled GLS estimation.

Table 4. Restricted F-Test of Heterogeneity

Null Hypothesis	F-statistics	Probability	Degree of Freedom
Ui=0	4.57	0.0000 ***	(246, 2010)

*Source: Author's computation, 2017. Note that *** denotes significance at 1% level*

From the table 4.4 above, F-statistics values of 4.57 with probability values of 0.0000 implies that there is enough evidence to reject the null hypothesis that all differential intercept corresponding to the cross-sectional specific units are equal to zero. Therefore, it can be concluded, that there is cross-sectional uniqueness/heterogeneity effect among the 250 SSA commercial banks used in this study to quest for the effect of operational diversification on financial performance. Thus, pooled regression estimator restriction is not valid as cross-sectional heterogeneity effect is too significant to be overlooked and ignored.

4.4.2. Hausman Test

In an attempt to know the most reliable estimation between the fixed effect estimation and the random effect estimation, Hausman test is conducted to test if there is a substantial difference between the estimates of the fixed effect estimator and that of the random effect estimator. The null hypothesis underlying the test is

that, fixed effect estimates do not differ substantially from the random effect estimates. Notably, the test statistics developed by Hausman has an asymptotic chi-square distribution.

Table 5. Hausman Test of FEM and REM

Null Hypothesis: there is no substantial difference between fixed effect and random effect estimates		
Test-Estimate	Chi-Square Statistics	Probability
chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)	34.22	0.0000***

*Source: Author's Computation, 2017. Note that *** denotes 1% significant level, b = consistent under H_0 and H_1; obtained from xtreg and B = inconsistent under H_1, efficient under H_0; obtained from xtreg*

From the Table 4.5 above, chi-square value of 34.22 alongside a probability value of 0.0000 shows that there is enough evidence to reject the null hypothesis, hence, the difference in coefficients is unsystematic and highly substantial. This implies that there is correlation between the random effects incorporated into the composite error term and one or more of the independent variables. Thus, the FEM estimation becomes the best model that is most efficient, consistent and preferred, while REM estimation is considered inefficient.

From the foregoing, out of the three estimators (pooled regression estimator, fixed effect estimator, random effect estimator) used for static analysis of examining operational diversification and financial performance in SSA banks, fixed effect estimator is the most appropriate estimator. Nonetheless, privy to the fact that in a model where there is large N (cross-sections) and T (time period) is relatively small; the fixed effect estimator becomes inconsistent because it is just an OLS estimator based on first difference. In this situation, GMM estimator becomes more reliable, efficient and superior (Han & Phillips, 2010).

The model used for this study is for 10 years (2006-2015) due to availability of data. Also, as noted by Han and Phillips (2010), when T is small, the estimator becomes asymptotically random. System GMM was proposed by Arellano and Bover (1995); Blundell and Bond (1998) and Hsiao et al. (2002) to solve this problem because system GMM uses level equation based moment conditions with the usual orthogonality conditions of Arellano and Bond GMM type. Hence, this study proceeds to the System GMM analysis due to the inconsistency of the FE estimator selected by Hausman test.

4.5. Dynamic Panel Analysis: System Generalised Method of Moments

This section presents the result of the dynamic analysis conducted to determine the effect of operational diversification on banks financial performance in SSA when the influence of past realization of return on average asset (measure of financial

performance) is put into consideration. Although, GMM can be used for diverse purposes in econometric analysis, for the purpose of this study, it was used to measure the effect of past realizations of the dependent variable. Notably, Arellano and Bond (1991b) pointed out that GMM estimators relative to first-difference estimator, OLS estimator, IV estimator etc, exhibits bias and variances, thus, the rationale behind the choice of estimator (Two- step) employed in this study.

Table 6. Two Step SYS-GMM of the series: HHIas, HHIde, HHIlo, HHIin, SIZ, LOD, LLR, CIR with Dependent Variable: ROAA

No of groups: 246		
No of Instrument:110		
F (9, 245) = 1.54e+06		
Prob (F) = 0.0000***		
Variable	Coefficient	p>/t/
C	2.559945	0.000***
ROAA(L1)	0.1711913	0.000***
HHIas	6.84e-10	0.000***
HHIde	-2.07e-08	0.000***
HHIlo	9.59e-09	0.000***
HHIin	0.0058587	0.000***
SIZ	0.0438818	0.000***
LOD	-0.0062261	0.000***
LLR	0.0037591	0.000***
CIR	-0.0238368	0.000***

*Source: Author's computation, 2017. Note that ***, ** denotes significance at 1% and 5% level respectively*

From SYS-GMM analysis on Table 4.6 above, all the variables of interest including the lagged return on average asset (ROAA (L1)) were significant at 1% level with only deposit diversification (HHIde), liquidity (LOD) and cost to income ratio (CIR) which is a measure of banks' efficiency as having negative relationship with ROAA. The significant and positive effect of asset, loan and income diversification conforms to the resource-based value (RBV) theory that postulate how firm can boost their performance with their available resources via competitive advantage, scope and scale efficiency from synergy. Asset, income, loan and deposit are various resources at the disposal of commercial banks which they can actively utilise to boost their performance and growth. The negative effect of deposit diversification, though with a very small coefficient may be due to the problem of managerial entrenchment and hubris. Also, it's a newly introduced dimension of diversification in banking sector because banks concentrated only on revenue diversification strategy and this has reduced the market power degree banks posses in deposit diversification (Skully & Perera, 2012). Deposit is the main

liability of banking sector with larger proportion from customers (customers' deposit) and managers are the people in charge of its utilisation to induce growth and wealth maximisation. Most managers due to agency problem view diversification as an opportunity to raise their power and prestige hence fail to run diversified activities in such a way to create more value to the firm. The positive and significance of asset, loan and income diversification conforms to the findings from the study of Ugwuanyi and Ugwu (2012); Turkmen and Yigit (2012); Gurbuz et al. (2013); Senyo et al. (2015); Sissy (2015); Mulwa et al. (2015) where they found that diversification reduces systematic risk, reduces earnings volatility, reduce agency but oppose the findings of Behr et al. (2007); Mishra and Sahoo (2012); Armstrong and Fic (2014) where they posited that diversification in banks has failed to create value and banks with greater operational diversification tends to witness fluctuations in financial performance due to the failure in setting the optimum degree and inability to know the right and viable diversification areas. Furthermore, the negative findings of deposit might be due to the economic instability and challenges faced with most of the countries in SSA used for this study during the sampled time frame because the major component of bank deposit is from customers and the degree of market power of banks in this deposit diversification is still low to witness the hit of competition that will enable them to enjoy economies of scale and scope from bank deposit. Notwithstanding this finding conforms to the finding of Baele et al. (2007).

The findings of all other control variables conform to the Apriori expectation except liquidity (LOD) that has negative relationship with bank performance. In reality commercial banks in most of the countries in SSA operates beyond the prudentially prescribed liquidity ratio limit because of the high proportion of their liquid asset so as to absorb the unexpected liquidity shocks that can hinder their stability and growth. The negative effect of liquidity calls for prompt attention to ensure that banks are not over or under liquid as this can cause agency problem (cost) due to the unjust use of the free cash flow or lack of finance on the other hand. While over liquidity in banks implies that banks will be incapacitated to meet unexpected or occasional withdrawals of fund, under liquidity of low liquidity implies that banks may not have enough finance to explore opportunities and hence, generate low earnings (Demirgüç-Kunt & Huizinga, 2010). In essence, banks must be careful in choosing dividend policy such that the liquidity of the bank will not be jeopardised. As dividend payout reduces free cash flow, dividend retention policy also gives room for adequate financing of viable projects that justifies the banks' growth.

Bank size's (SIZ) positive and significant effect on financial performance conforms to the findings of Stiroh (2004); DeYoung and Rice (2004); Stiroh and Rumble (2006), Afzal and Mirza (2012). Bank size is a variable used in banking sector to control for risk and cost difference. Its finding in this study implies that the higher

the total asset of banks, the more they are able to diversify into viable investment opportunities, explore diverse business lines, build market power and hence, create more value that will boost the exploitation of economies of scale and scope and hence better and greater financial performance.

Regarding the cost income ratio, it is pertinent to know that a higher CIR depicts an increasing inefficiency (poor performance) and a reduction in CIR depicts managerial efficiency which is expected to boost banks financial performance (Goddard et al., 2008). Hence, the negative effect of CIR on banks performance implies a decreasing cost inefficiency which is a good signal of managerial efficiency and going-concern concept for banking sector in SSA because performance of commercial banks is improved whenever they are cost and operationally efficient (Simpasa & Pla, 2016).

4.6. Diagnostic Test for SYS-GMM

Despite the numerous merits attached to dynamic data analysis, presence of auto correlation or serial correlation and over-identification of instrument has been the common problem attached with generalised method of moments (GMM). These problems limit the efficiency of GMM estimators (Hayakawa, 2014). As also, noted by Hayakawa (2014), there are two main factors that determine the GMM estimator finite sample behaviour; viz, the numbers of moment conditions and the strength of instrument identification. To test for the identification problem validity in GMM, J-test (Hansen/Sagan test) has been the widely accepted test but the validity of the instrument and the reliability of SYS-GMM estimation is checked using the Hansen test while the serial correlation is tested using the Arellano and Bond (1991a) order one and two tests.

Therefore, following Pathan and Skully (2010), Hansen test for over-identification of instrument, AR (1) and AR (2) tests for auto correlation are used as the post estimation check for the justification of efficient estimate in our dynamic panel analysis conducted for operational diversification and financial performance of banks in SSA.

Table 7. Hansen Test

Ho: There is no over-identification of instrument		
Chi^2 (100)	93.13	
Prob>Chi^2	0.562	
Hansen test for all levels		
Excluding group	Chi2(50)	52.03
	Prob >Chi2	0.395
Difference (H0=exogenous)	Chi2 (50)	45.10
	Prob >Chi2	0.670

Source: Author's Computation, 2017

Using bank size (SIZ) as the instrument for orthogonal deviation, the results from Table 4.7 above shows that the probability value of Hansen tests for both including and excluding group (56.2, 39.5 and 67% respectively) are greater than 5% and considered insignificant. Hence, we conclude that our SYS-GMM estimation is efficient and reliable with valid instrument as the null hypothesis is accepted that there is no over specification of instruments used in the operational diversification model analysis.

Table 8. Arellano and Bond AR (1) and AR (2) Serial Correlation Tests

Ho: There is no serial correlation		
Order	Z	Prob>Z
AR (1)	-3.59	0.000***
AR (2)	1.42	0.156

*Source: Authors' computation 2017. Note that "***" represent 1% level of significance*

The Table 4.8 above shows the AR (1) and AR (2) results of the test for serial/auto correlation. At order one, it is expected that there will be serial correlation irrespective of the lag length but to correct itself at order two. From the findings in Table 4.8, we reject the null hypothesis in the AR (1) with 0.000 probability value and accept the null hypothesis at AR (2) with 15.6% at lag structure (2/2) used to estimate the SYS-GMM. The acceptance of the null hypothesis at order two implies that there is no evidence of serial correlation at the chosen lag length. Thus, the findings from operational diversification model estimation in SSA banks are efficient, consistent and reliable.

5. Conclusion and Implication of Findings

Privy to the inestimable merits and robustness of SYS-GMM analysis, the findings form SYS-GMM will be the basis of conclusions and recommendation on SSA banks' operational diversification model. Hence, this study concludes that diversification of operational activities in SSA commercial banks have direct and significant effect on their financial performance. But, greater attention should be taken to monitor the diversification strategy so as to ensure that no dimension of banks activities is neglected. It is better for banks to build market power from all its resources as this serves as a weapon in the midst of competition. Also, managers' pecuniary benefits and incentives should be under a control to ensure that the problem of managerial hubris and managerial entrenchment is reduced to the barest minimum as it has been averred by Aggarwal and Samwick (1999) that greater diversification is characterised by higher managerial incentives which can perpetrate exorbitant agency cost that hinders bank performance if not monitored. Managers love to take advantage of diversification due to the quest for dignity and prestige, diversify to suit their purse alone. It is possible for them to maximise

profit but not wealth because of their own fringe benefits. This can be the reason for SSA banking sector (South Africa excluded for obvious reasons) to still remain immature despite the fact that they are highly diversified with high rate of competition that makes them to build up their individual market power. For instance, Kenyan banking sector consist of 43 commercial banks and even Nigeria which has the second largest banking market have launched into other activities aside their primary intermediation role such as Banc-assurance, financial advisers, mortgage banking, asset advisory and management, pension administrator and export-trade financing. By implication, following the RBV theory, all these operational resources (assets, loans, deposit and income) are tools in banking sector to utilise such that they can explore wider, new and viable investment opportunities in addition to their traditional intermediary role to an extent that they will have a strong market power that can withstand competition as the sector is highly competitive in the region, but should involve human capital training, development and deployment so that the goal of the diversification will be adequately and totally achieved.

The fact that the number of instrument (110) is far less than the number of group (246); all the Hansen, AR (1) and AR (2) tests are passed and the F-test of joint significance of independent variable depicts that all the independent variables on the operational diversification model are jointly significant at 1%, the SYS-GMM estimate is an efficient estimate and the basis upon which our recommendation will be made at the end of the study.

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